## REMARKS

The Specification has been amended to correct typographical errors only and, thus, does not present new matter. Claims 1, 5, and 13 have been amended for clarification purposes. Claims 1-20 are currently pending in the case. Further examination and reconsideration of the presently claimed application are respectfully requested.

### Objections to the Specification

The Specification was objected to for an informality. The Office Action states that reference numeral "172" should be changed to reference numeral "171" on page 11, line 2 of the Specification. The Specification has been amended in a manner that addresses the concerns expressed in the Office Action. Accordingly, removal of the objection to the Specification is respectfully requested.

### Objections to the Drawings

The drawings were objected to because Figures 1A-1D are sectional views, but they are not crosshatched. In response to the issues raised in the Office Action, a Request for Approval of Drawing Changes is included herewith in a separate paper. As illustrated on the accompanying drawings, Figures 1A – 1D have been amended to include crosshatches for solder bumps 110, solder balls 150, and bonding pads 105 and 155. For the sake of brevity, Applicants has omitted the crosshatches to substrate 160 and integrated circuit 130 since these areas are semiconductor areas and, therefore, do not warrant a cross-hatch. Applicants request approval of the drawing changes shown in red. Once approval is granted, the indicated changes will be incorporated into the final, formal drawings to be filed when the application is allowed.

### Section 102 Rejection

Claims 1-20 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,534,784 to Lum et al. (hereinafter "Lum"). As set forth in more detail below, the § 102 rejection of claims 1-20 is respectfully traversed. The standard for "anticipation" is one of fairly strict identity. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2

USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP 2131. Lum does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

**Lum does not teach a movable table that is adapted to secure a substrate.** Claim 1 recites a table movable in a first direction, wherein the table is adapted to secure a substrate. The table embodies trace conductors that have opposite ends of the trace conductors terminating at respective opposing planar surfaces of the substrate. The amendments to claim 1 are fully supported in the specification as originally submitted. In particular, Fig. 2 of the original specification depicts a substrate 555 that is securable to a table 540. Table 540 is movable in a first direction by rotating lead screw 512 (Specification -- pg. 11, lines 15-22). Thus, table 540 will move along with the secured substrate 555 in a direction substantially parallel to the axis along which lead screw 512 extends.

The Office Action contends that Lum teaches a movable table. Specifically, the fourth paragraph of the Office Action alleges "a table moveable 62 in a first direction . . ." Applicants disagree. The Office Action presumably alleges that substrate 64 of Lum is equivalent to the presently claimed substrate. If so, the Office Action further alleges that probe card 62 is adapted to secure substrate 64. While Applicants agree that probe card 62 will secure substrate 64, Applicants must respectfully disagree that probe card 62 is movable. In fact, probe card 62 is stationary and the chuck (bearing wafer 50) is movable. It is well-known that during a wafer probe operation addressed by Lum, probe card 62 remains fixed as part of the tester, and that the various die 52 along wafer 50 move each time a probe operation proceeds from one die to the next. See, for example, Lum -- col. 1, lines 23-25 ("after the completion of testing on one die, the wafer is moved so that testing can be formed on the adjacent die." Emphasis added.) If both the die and the test card were to move, one certainly would expect that the test operation could not proceed from one die to the next. Accordingly, the allegations made in the Office Action that probe card 62 is movable cannot be sustained.

**Lum does not teach a pin retainer that retains only one upwardly extending pin (claim 5), or contacting an upwardly extending pin with only one of a plurality of downward extending terminals (claim 13).** Claims 5 and 13 make clear that the present claims deal with a test fixture and, specifically, a test fixture that uses a single pin to contact only one of a plurality of terminals associated with the substrate. Applicants wish to point out that the concept of using a single pin and moving that pin relative to a movable substrate is illustrated in Figs. 2, 3A, and 5 of the originally filed specification.

While semiconductor substrate 555 is retained between retainers 530 and 560, table 540 which is fixed relative to the retainers is movable by lead screw 510. As lead screw 512 is rotated, table 540 moves as does the secured substrate 555. Probe pin 670 is also movable in two directions perpendicular to the first direction along which substrate 555 is movable. By rotating thumbscrew 665, probe pin 670 can be moved upward or downward (i.e., perpendicular) to the lower planar surface of substrate 555. Also, by rotating lead screw 512, probe pin assembly 660 can be moved parallel to the lower surface of substrate 555, and perpendicular to the direction at which substrate 555 is movable.

While probe pin 670 is movable in two directions perpendicular to the movement of substrate 555, in each instance, however, probe pin 670 represents only a single pin. Moreover, the single probe pin contacts only a single one of the plurality of downward extending terminals or solder balls 610 arranged on the lower surface of substrate 555. A probe needle 890 can be placed on a solder ball 550 on the upper surface of substrate 555. The combination of the probe pin and probe needle, therefore, form the continuity check effectuated by the present test fixture. Again, however, only a single probe pin is used and is placed only on one of the plurality of downward extending terminals.

Contrary to a single probe needle placed on only one of a plurality of terminals within a substrate, each pin 80 of substrate 64 in Lum must be contacted with each probe wire 84 of array probe head 68 (Lum -- Fig. 2; col. 5, lines 63-67). If, for some hypothetical reason, only one contact is made between a probe pin and a substrate terminal in Lum, it could not suffice as a production probe fixture where every bonding pad or solder ball of the die is tested for operation. Modifying Lum so that only one contact is made would destroy the intent behind production probe testing as taught in Lum.

For at least the reasons set forth above, Lum does not teach, suggest, or provide motivation for all limitations of independent claims 1, 5, and 13. In addition to the distinctions of the independent claims, numerous dependent claims are also not described in Lum. For example, Lum does not suggest a probe needle in combination with a probe pin (claim 6); elongated walls of a table for securing a substrate (claim 9); a push plate secured by a thumbscrew (claim 10); first and second lead screws (claim 11); a third lead screw (claim 12); etc. Therefore, claims 1, 5, and 13, and claims dependent therefrom, are patentably distinct over the cited art. Accordingly, Applicants respectfully request removal of the § 102(e) rejections of claims 1-20.

## CONCLUSION

This response constitutes a complete response to all issues raised in the Office Action mailed October 24, 2002. In view of the remarks traversing the rejections, Applicant asserts that pending claims 1-20 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned attorney earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to LSI Logic Corporation, Deposit Account No. 12-2252/01-120.

Respectfully submitted,

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**ATTACHMENT A**
**"Marked-Up" Amendments**

Please amend pg. 11, lines 1-13 as follows:

Fig. 1D is a cross-sectional view of Fig. 1C, where a testing device 190 is electrically connected to trace conductor 160 at probe points ~~172~~171 and 180. Testing device 190 may be a multi-meter for measuring the electrical continuity of trace conductor 160. One probe wire coming from device 190 is attached to solder ball 150 by, for example, solder joint 193. The other probe wire coming from device 190 has a probe needle 198 attached at its end and is typically manually placed into electrical contact with upper terminus 171. A magnifying lens of 2X or 5X may be employed to help locate and contact upper terminus 171 with probe needle 198. Unfortunately, during the lapping process, solder joint 193 may be jeopardized. Instead of connecting the probe needle by solder, it is desirable make frictional contact after the lapping process. Contact is contingent upon bring the opposing terminals in contact with the rather fine-line terminal ends of the trace conductor using a moveable substrate holder and moveable pin retainer to make contact as described in herein below.

Please amend pg. 11, line 24 – pg. 12, line 14 as follows:

Fig. 3A is a bottom view of semiconductor device package substrate probe fixture 502. Package holding table 540 has rectangular opening for exposing the bottom solder balls 610 of package substrate 555. Moveable table 540 is shown on sliding rods 520 and attached to lead screw 512. Probe pin 670 extends upward from a moveable pin retainer 660. Retainer assembly 660 can be moved in a vertical direction, perpendicular to the direction at which table 540 moves by adjusting lead screw 510 that is attached to assembly 660, which slides assembly 660 on slide rods 625. Thus probe pin 670 can be aligned in the horizontal and vertical (i.e., along both the x- and y-axis) with any solder ball 610 by adjusting lead screw 512 and/or lead screw 510. Probe pin 670 can be adjusted in the vertical axis to make strong mechanical and electrical contact with a solder ball 610, by vertical height adjusting thumbscrew 665. Probe pin 670 is preferably a pogo pin with an internal spring at the base, which helps provide a firm contact on solder ball 610, while preventing a destructive pressure from being applied to the solder ball 610. Furthermore, probe pin 670 is electrically coupled to electrical outlet socket 675 by electrical wire 672. By rotating thumb screw 512, pin 670 moves in an x-axis; by rotating thumb screw 510, pin 670 moves in a y-axis perpendicular to the x-axis, and by rotating thumb screw 665, pin 670 moves in a z-axis perpendicular to the x-~~a~~axis and y-~~axes~~axis. Importantly, the distal end of pin 670 can

be moved in fine-line increments in three axes relative to a solder ball on the underneath side of a substrate. Pin 670 frictionally engages with the solder ball, without employing a solder connection and the problems associated therewith.

Please amend claims 1, 5, and 13 as follows:

1. (Amended) A test fixture, comprising;

a table moveable in a first direction, wherein the table is adapted to secure a substrate embodying a trace conductor having opposing ends terminating at respective opposing planar surfaces of the substrate; and

a probe pin moveable in two directions perpendicular to the first direction, wherein the probe pin is adapted to contact a first one of the opposing ends.

5. (Amended) A test fixture, comprising:

a pin retainer for retaining ~~an~~only one upwardly extending pin;

a semiconductor substrate retainer having a trace conductor with one end of the trace conductor arranged above the pin; and

a mechanism for moving the pin retainer and semiconductor substrate in two dimensions for aligning the probe pin onto said one end of the trace conductor.

13. (Amended) A method for testing a semiconductor package, comprising:

moving a substrate bearing a plurality of downwardly extending terminal ~~end~~ends of a trace conductor along an x-axis; and

moving an upwardly extending pin along a y-axis and a z-axis to make contact with only one of the plurality of downwardly extending terminal ~~end~~ends.